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L3: Entry 1 of 356 File: USPT Apr 1, 2003

DOCUMENT-IDENTIFIER: US 6542995 B2
TITLE: Apparatus and method for maintaining secured access to relocated plug and play peripheral devices

Brief Summary Text (5):
Contained within a portion of the computer system non-volatile memory is a program often referred to as Basic Input/Output System ("BIOS"). BIOS is the interface between the computer system hardware and the operating system and applications software. The BIOS is generally run at boot-up in order to establish the serial and parallel ports, test memory, and generally determine the overall hardware configuration of the computer system. Thereafter, the processor within the computer system is instructed to read the operating system software (and eventually the applications software) from a configured disk drive.

Detailed Description Text (86):
In another embodiment of the invention, the control circuit is in the form of a microcontroller, and the digital-to-analog converter circuit is in the form of an R-2R resistor ladder. Preferably, the microcontroller and R-2R ladder network are combined on a single integrated circuit (IC). This provides benefits of reducing both cost and space.

CLAIMS:

5. The device of claim 4, wherein the control circuit further includes a second input, and the device further includes:

a memory coupled to the second input of the control circuit, for storing a plurality of calibration values, each calibration value defining a drive value of the digital control signal for each of the plurality of first sensor components, wherein the first drive value is defined by one of the plurality of calibration values.

6. The device of claim 1, wherein the control circuit, the digital-to-analog converter, and the measuring circuit are integrated within a semiconductor component.

13. The device of claim 11, wherein the control circuit further includes a second input, and the device further includes:

a memory coupled to the second input of the control circuit, for storing a plurality of calibration values, each calibration value defining a drive value of the digital control signal for each of the plurality of first sensor components, wherein the first drive value is defined by one of the plurality of calibrated values.

Detailed Description Text (58):
Alternative embodiments of the present invention implement a desirable sensitivity curve in other portions of the hardware. For example, FIG. 11 is a front-view and FIG. 12 is a side-view of a resilient mechanism for one embodiment that attains a desirable sensitivity curve by utilizing resilient mechanisms with a non-linear response curve. The resilient mechanism 202 is constructed to provide higher resilience for weaker applied forces than for stronger ones. Thus, the apparatus provides more precision for smaller applied forces, and faster response for larger applied forces. As seen from the Figures, as the apparatus is displaced the mechanism 202 twists, much like that described for resilient mechanism 102. However, the surfaces 214 and 215 contacting the mechanism 202 effectively change in length, i.e., as the apparatus is displaced more surface contacts the mechanism. Thus the mechanism experiences a non-linear response curve.

Detailed Description Text (73):
To control the emitting array so that the output of each LED is uniform, the invention provides for a method of calibration. The invention is calibrated by first placing the optical masks (e.g., the masking portions 211 of the resilient mechanisms of the second embodiment) at a default location (e.g., their midpoints, or at a hysteresis position of minimum stress). Then, the LEDs are driven in digital increments until the output of each sensor set (i.e., the output of the corresponding photodiode) provides a reading close to a predetermined value. The predetermined value may be a previously calculated nominal operating value or more preferably a value close to the midrange of possible values (e.g., the 512th value of 1024 possible values). The values are then stored in a memory (not shown) accessible by the control circuit.

Detailed Description Text (75):
The signal processing circuit 300 includes a memory 316 (see FIG. 19) for storing the calibration information. The control circuit 302 accesses the calibration information in the memory 316 during the driving phase to determine an LED drive current, and during the measuring phase to determine the settling time required before the sensing array result is to be tested. In particular, a dedicated register is used for storing the settling time.

Detailed Description Text (78):
An exemplary force and torque converting system 500 is shown in FIG. 21 according to an embodiment of the invention. An external device 502 includes a microcontroller 504 and memory 505. Force and torque converter 510 includes control logic 512 (such as the circuitry shown in FIG. 19) which includes volatile RAM 514 (e.g. memory 316 in FIG. 19), and non-volatile RAM 516. The control logic 512 is coupled to the microcontroller 504 through connection 506. The non-volatile RAM is coupled to the microcontroller 504 through connection 508. Alternatively, the microcontroller 504 uses a single connection to communicate with both the control circuit 512 and the non-volatile RAM 516.

Detailed Description Text (81):
When the device is started, the microcontroller 504 reads the calibration information from the non-volatile RAM 516. The microcontroller relays some of the calibration information to the control logic 512 which stores the relayed information in the volatile RAM 514. In particular, the microcontroller relays the LED calibration values, the settling time value, and the RC oscillator information to the control logic 512 and stores the scale factors in the memory 505. This provides the benefit of quicker access, and more reliable access to the calibration values. For example, the control logic 412 accesses the volatile RAM 512 at memory access speeds rather than serial communication interface speeds. Furthermore, higher reliability is achieved due to less noise received during each access since the adjacent memories provide shorter electrical distances.

Detailed Description Text (82):
Preferably, the control logic 510 includes one or more of the circuits shown in FIG. 19 on a single application specific integrated circuit (ASIC). Additionally, the ASIC includes the above-described interface circuitry that enables the ASIC to conveniently interface with an external device 502 such as microcontroller 504.

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L17: Entry 1 of 2 File: USPT Aug 25, 1998

DOCUMENT-IDENTIFIER: US 5798748 A
TITLE: Force and torque converter with improved digital optical sensing circuitry

Brief Summary Text (8):
There are two major types of prior art mice: the mechanical mouse, and the optical mouse. Both types are displacement sensing devices. As such, both types have the disadvantage in that they must frequently be lifted and reoriented to allow further movement. For example, the user's range of comfortable motion is often reached before the user is finished "dragging" a graphical object across the screen. Consequently, the user must stop the operation and lift and reorient the mouse, before resuming the desired task. In addition, small work space environments exacerbate this annoying feature, as there is less space in which to displace the mouse.

Brief Summary Text (9):
Besides these ergonomic disadvantages, mechanical mice require regular cleaning and can slip during operation. This results in inconsistent operation. Most optical mice require an optical pad to operate.

Brief Summary Text (45):
In another embodiment, the control circuit further includes a second input, and the device further includes a memory coupled to the second input of the control circuit, for storing a plurality of calibration values, each calibration value defining a value of the control signal for each of the plurality of first sensor components.

Brief Summary Text (46):
In another embodiment, the control circuit, the digital-to-analog converter, and the measuring circuit are integrated within a semiconductor component.

Brief Summary Text (50):
In another embodiment, the control circuit further includes a second input, and the device further includes a memory coupled to the second input of the control circuit, for storing a plurality of calibration values, each calibration value defining a value of the control signal for each of the plurality of first sensor components.

Detailed Description Text (52):
FIG. 9 is a logic-block diagram of a signal processing mechanism suitable for the invention. Analog output from sensors 104 is converted to a digital value by a dual-slope A/D circuit 120 controlled by a microprocessor 121 and firmware 122. The A/D conversion rate desirably matches or exceeds human response rates for suitable operation. Conversion rates of the order of 100 sets per second are suitable. The dual-slope technique provides a suitable conversion rate at very low cost. It will be apparent to those skilled in the art that other conversion techniques can be employed. In one embodiment of the invention the A/D circuit 120, microprocessor 121 and firmware 122 are placed in the space between grip 100 and base 99 (see FIG. 4). In another embodiment, however, the circuit, microprocessor and firmware is external to the apparatus.

Detailed Description Text (56):
In one embodiment, a null region value and a set of 16 values is stored in a table within the firmware. By using a table whose size is a power of two, such as 16, bits of the binary representation of the applied force and torque, received from the conversion hardware, can index into the table. Linear interpolation is utilized for any received values falling between the 16 values.